DECISION DOCUMENTATION PACKAGE COVER SHEET

prepared in accordance with

TRACK 1 SITES: GUIDANCE FOR ASSESSING LOW PROBABILITY HAZARD SITES AT THE INEEL

Site description: Abandoned Buried Diesel Fuel Line from TRA-727 and TRA-775 to ETR

Site ID: TRA-57 **Operable Unit: 2-14**

Waste Area Group: 2

I. SUMMARY - Physical description of the site:

New Site Test Reactor Area (TRA)-57 is an abandoned buried diesel fuel line, consisting of approximately 580 m (1,900 ft) of 5.08-cm (2-in.) diameter carbon steel piping. This line was installed during Engineering Test Reactor (ETR) construction, between 1955 and 1958, and was abandoned in the early 1980s. The line was used to transfer diesel fuel from Bulk Diesel Fuel Tanks (TRA-727C, TRA-727D, and TRA-775) to three separate buildings, which were part of the ETR facility: TRA-643, TRA-648, and TRA-656. Small quantities of the diesel fuel were used in an experimental process to lubricate compressors at TRA-643 and to fuel space heaters located in TRA-656. The bulk of the diesel fuel was used to operate a backup electrical generator in TRA-648. Two small quantity day tanks were used to supply diesel fuel to the three buildings because the length of the pipeline caused the diesel fuel flow rate to be slow. The pipeline was separated and blind flanged at TRA-627 and is believed to be capped at each of the three branches in TRA-643, TRA-648, and TRA-656. There is currently no evidence of corrosion in the visible portions of the piping. On December 3, 1990, a "Tracer Tight" test was performed on the current configuration of the diesel fuel line and the results of the test indicated no leaks in the line.

The line contains fuel blend types of diesel fuel oil. Grade No.1 is a special purpose, light distillate fuel to be used in applications requiring higher volatility than that provided by Grade No. 2 diesel fuels. Grade No. 2 diesel is a general purpose, middle distillate fuel suitable for use in applications in which

there are conditions of frequently varying speed and load.

According to Mr. Harry Williams[1], the former ETR shift supervisor, the backup electrical generator located in TRA-648 stopped operating sometime during the final run of ETR in 1981 because it was not receiving any fuel. This prompted the excavation of the diesel fuel line in 1981. The line was excavated and a leak was identified, and the pipeline was repaired by reconfiguring it to utilize an abandoned nearby section of an underground steam line. The location of the piping reconfiguration can be identified at TRA-57 by a long narrow section of new asphalt just east of TRA-648. Two releases from the diesel fuel line were reported in the early 1980s and are documented in the *Preliminary Scoping Track 2 Summary Report for the Test Reactor Area Operable Unit 2-04: Fuel Spills*[2]. It is believed the first release occurred in 1980, and the second occurred in late 1981. The estimated quantity of diesel fuel and the extent of soil impacted by the releases are unknown (see Question 3). Subsequent to those noted above, there is no evidence of additional releases from this piping.

DECISION RECOMMENDATION

II. SUMMARY – Qualitative Assessment of Risk:

The level of reliability of the information collected and presented is high. The overall risk associated with the pipeline is low because the pipeline is separated and blind flanged at TRA-627, and is believed to be capped at each of the three branches (TRA-643, TRA-648, and TRA-656). In addition, there is no evidence of corrosion in the remaining line. Although the line may have leaked at one time, a "Tracer Tight" test was performed on the newly configured diesel fuel line on December 3, 1990, and its integrity was confirmed. The results of the test indicated no leaks in the line. Soil impacted by the releases of diesel fuel in 1980 and 1981 may still be present under the asphalt at TRA-57. While this may pose a risk at the site, if the soil was excavated and removed, the risk of exposure potential would be increased. The risk from the area of potential diesel contamination could be high and warrants further evaluation.

III. SUMMARY – Consequences of Error:

False Negative Error. The false negative decision error would be to conclude that there has not been a release from the diesel fuel line into the soil at TRA-57. Concluding that the contents of the line have been released when in fact they have not, would result in inappropriately recommending a no further action alternative for the site. The consequences of this would be fewer controls in place to ensure protection of the public and the environment for the chosen remedial alternative when in fact these controls should be in place. In addition, if no further action is taken and an undetected release has occurred at the site, there may be the potential for migration via the groundwater pathway resulting in higher risk than anticipated.

False Positive Error. The false positive error would be to conclude that there has been a release from the diesel fuel line into the soil at TRA-57 when in fact there has not been a release. If action were taken at a clean site, this would result in the unnecessary expenditure of resources.

IV. SUMMARY – Other Decision Drivers:

While there may be a risk from leaving the pipeline in the ground, if the pipeline and contents were excavated and removed, the risk of exposure potential would be increased. Consequently, the risk would be greater by excavating and removing the pipeline due to the surrounding facilities, utilities, and other buried lines in the vicinity compared to leaving the pipeline in the ground until the entire area can be deactivated.

Currently, the reconfigured diesel fuel line is intact, and there is no evidence of corrosion. On December 3, 1990, a "Tracer Tight" test was performed on the newly configured diesel fuel line and its integrity was confirmed. The results of the test indicated no leaks in the line. Although the diesel fuel line may have leaked in the early 1980s, the leak was repaired; the leak test conducted in 1990 confirmed the integrity of the diesel fuel line.

On February 5, 2001 a decision was made and agreed to by all parties that additional information should be gathered to hopefully define the extent of the potential diesel plume between TRA-57 and the PW-13 well. All available data from the 1980 and 1981 releases would be gathered under the existing Record of Decision (ROD). Based upon this information, the risk would be re-evaluated and a decision for further action would be made. The estimated quantity of fuel released to the environment as a result of the leaking fitting was calculated in the following manner. The known flow rate of the pumps located at TRA-627 (15 to 25 gallons per hour (gph)) multiplied by the time expended between the observation that the day tank was not filling and the shutdown of the pump plus the holding capacity of the 3" diameter piping run from the point of the leak back to TRA-627. The result of the calculation was that the estimated quantity of the release was approximately 2,000 gallons (Attachment A).

A Groundwater Screen was run assuming that all 2,000 gallons of the release had migrated toward the Snake River Plain Aquifer (SRPA). Percent mass of each of the contaminants of concern (benzene, toluene, ethylbenzene, xylenes (mixed), napthalene and methylnapthalene commonly found to be present in diesel fuels were used in the calculations. The results of the calculations revealed that all of the 30-year average concentrations of all contaminants are below the Environmental Protection Agency Region 9 Preliminary Remediation Goals (PRG's) with the exception of methylnapthalene (Attachment B). A determination could not be made with regards to methylnapthalene because no PRG has been published for this contaminant. Based on these calculations and comparisons it is believed that the presence of the diesel fuel on the perched water table poses no risk to the SRPA at this time.

Recommended action:

No further action should be conducted at the buried diesel fuel line at TRA-57, but the site should be reevaluated under a ROD. Site TRA-57 should remain under industrial institutional controls until the time that the site and the co-located lines can be deactivated and the risk evaluated. When the site is deactivated, safety measures will be in place to handle the removal of the materials and the surrounding obstacles.

No further action should be conducted with regard to the diesel fuel; PW-13 should continue to be monitored during the semiannual groundwater events. The diesel contamination between TRA-57 and the PW-13 well does not pose a risk to the SRPA at this time.

Signatures	# PAGES:	DATE:
Prepared By:	DOE WAG Manager:	18 Oct 01
Approved By:	Independent Review:	

Determination

The U.S. Department of Energy, U.S. Environmental Protection Agency Region 10, and Idaho Department of Environmental Quality have completed the review of the referenced information for Operable Unit 2-14, as it pertains to the INEEL Federal Facility Agreement and Consent Order of 1991. Based on this review, the Parties have determined that The site be addressed under OU 10-08 RI/FS Workplan but no further investigations at this time should be initiated.

Brief summary of the basis for the action:

Old diesel fuel line with history of releases

References:

Track 1 package

DOE Project Manager Kathleen E Hain 5/9/02
Date

EPA Project Manager Wayne Pierre 3/11/02
Date

IDEQ Project Manager Dean J Nygard 4/16/02
Date

DECISION STATEMENT
(by DOE RPM)

Date recd: 10/18/01

Disposition:

The fuel line between TRA-727 and TRA-775 to ETR, INEEL CERCLA site TRA-57, is capped but may contain residual diesel fuel. Release of any residual material is unlikely since the condition of the line seems to be good based on the 1990 tests. The consequence of line failure, worse case, would be contamination of the Snake River Plain Aquifer at levels below drinking water standards. The fuel line show be left in its current condition but re-evaluated when the surrounding buildings are deactivated. Monitoring of the PW-13 well should continue to be performed semiannually

DATE: 10/19/01	**# PAGES (decision statement):**
NAME: Kathleen Hain	**SIGNATURE:** Kathleen E Hain

Kathleen E Hain

DECISION STATEMENT
(by EPA RPM)

Date recd: 10/29/01

Disposition:

Buried diesel line which leaked in 1980's. It appears the past leaks were/are the source of diesel contamination observed in PW-13. The 2000 gal estimate is based on the potential release after catastrophic failure of pipe. It may be actually greater. The pipe is located ~ 5 ft bgs. While evidence does not support removal of pipe and contaminated soil at this time, it is unclear whether the past leaks represent an unacceptable threat to groundwater. Recommend that continued monitoring of PW-13 be performed and that site be included within scope of 10-08.

DATE: 3/11/02	**# PAGES (decision statement):**
NAME: Wayne Pierre	**SIGNATURE:** Wayne Pierre

DECISION STATEMENT
(by STATE RPM)

Date recd: March 18, 2002

Disposition:

TRA 57 Background and Recommendation

TRA-57 consists of the abandoned diesel fuel line that was repaired (reconfigured) in 1980. Subsequently, diesel started appearing in monitoring well PW-13 in 1990 through 1994, and reappeared again in 2000.

In February 2001 the DOE and Agencies agreed to the gathering of additional information to define the extent of a suspected diesel plume between TRA-57, the reconfigured piping, and monitoring well PW-13, and also reevaluate the risk. Based on the findings, a decision for further action would be made.

Attachment A, "New Information and Recommendation on Potential Diesel Release Near Well PW-13" discusses the findings of the agreed to study. Basically, the revised estimates provide a figure of approximately 2,000 gallons that may have leaked from the TRA-57 line prior to discovery of the leak, and subsequent repair and reconfiguration of the line.

A GWSCREEN analysis appears to indicate that all the diesel components comprising COCs (with the exception of methylnapthalene) are below EPA Region 9 PRGs. There is no PRG at this time for methylnapthalene. Based on the GWSCREEN analysis, there appears to be no risk to the SRPA posed by the diesel fuel on the perched water table beneath TRA.

The major contribution to onsite risk is the ingestion pathway. With indications that the perched water level is decreasing and the fact that it is not used as a drinking water source, the ingestion pathway is essentially eliminated from the overall risk. The remaining risk values and hazard indices (Attachment A, Table 3) show no risk to public health.

Recommend that TRA-57, the abandoned line, remain under industrial ICs until the time that the line can be deactivated and the risk evaluated.

Recommend that PW-13 continue to be monitored during the semi-annual groundwater events.

DATE: 4/16/02	**# PAGES (decision statement):**
NAME: Dean Nygaard	**SIGNATURE:** Dean J Nygaard

PROCESS/WASTE WORKSHEET
SITE ID TRA-57

Col 1 Processes Associated with this Site	Col 2 Waste Description & Handling Procedures	Col 3 Description & Location of any Artifacts/Structures/Disposal Areas Associated with this Waste or Process
Historical processes associated with this site were the routing of diesel fuel from TRA-627 and TRA-775 to TRA-643, TRA-648, and TRA-656. One abandoned buried diesel fuel line is still located beneath the ground surface. There are actually two abandoned lines immediately to the east of TRA-648; the first is the original diesel line, while the second is a section of a former steam line that was used to bypass the original leaking diesel line.	The pipeline currently contains fuel blend of #1 and #2 diesel. Diesel fuel from diesel fuel tanks (TRA-727C, TRA-727D, and TRA-775) was transferred through the diesel fuel line (approximately 580 m [1,900 ft]) to TRA-643, TRA-648, and TRA-656. Day tanks were used to provide fuel to the three facilities; these tanks were filled automatically, as needed, via pumps at TRA-627 and the diesel fuel line.	Artifact: Pipeline Location: Extends from TRA-627 and TRA-775 toTRA-643, TRA-648, and TRA-656. Description: The pipeline is a 5.08-cm (2-in.) carbon steel diesel fuel line and is currently approximately 580 m (1,900 ft) in length. East of TRA-648, a section of a former steam line currently bypasses the original diesel line. This cross-connection is visible at one end inside TRA-648, and it is believed that the other cross-connection is underground approximately 100 m (328 ft) east of TRA-648. The former steam line appears to be 3.8-cm (1.5-in.) carbon steel.

CONTAMINANT WORKSHEET

SITE ID Diesel Fuel Line (TRA-57)

PROCESS (Col 1) The routing of diesel fuel from TRA-627 and TRA-775 to TRA-643, TRA-648, and TRA-656

WASTE (Col 2) Fuel Blend of #1 and #2 diesel fuel

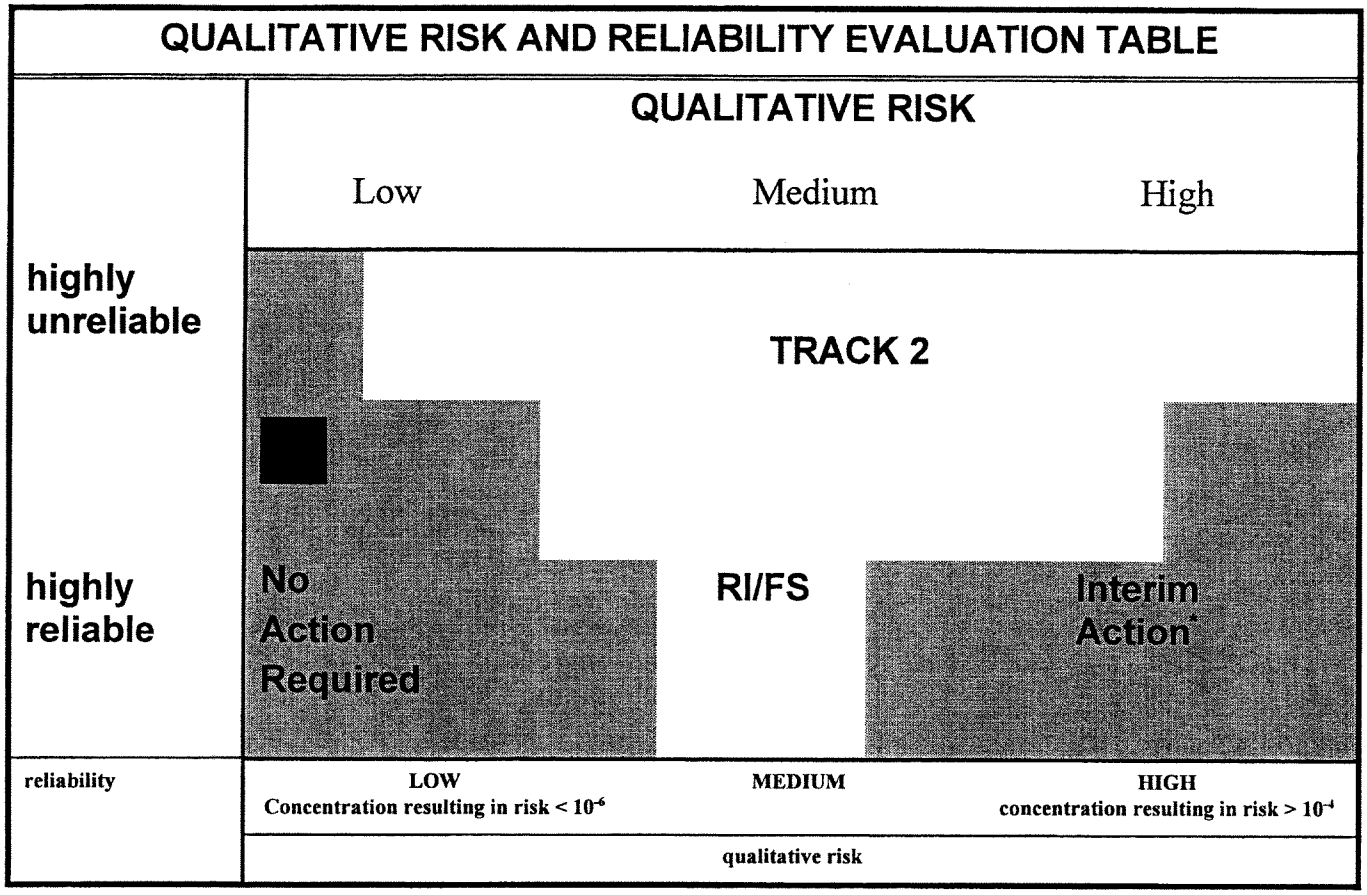
Col 4 What Known/Potential Hazardous Substances/Constituents are Associated with this Waste or Process?	Col 5 Potential Sources Associated with this Hazardous Material	Col 6 Known/Estimated Concentration of Hazardous Substances/Constituents	Col 7 Risk-based Concentration (mg/kg)		Col 8 Qualitative Risk Assessment (hi/med/lo)	Col 9 Overall Reliability (hi/med/lo)
Diesel fuel	Contents remaining in pipe	~ 100%	-----	-----	-----	-----
Naphthalene (<0.1%)	Contents remaining in pipe	2.237 x 10^3 mg/kg	56† – Residential Soil 190† – Industrial Soil	5.5**	Low %	High
Benzene*	Contents remaining in pipe	2.10 mg/kg	0.67† – Residential Soil 1.5† – Industrial Soil	0.06**	Low %	Low
Toluene*	Contents remaining in pipe	31.7 mg/kg	520† – Residential Soil 520† – Industrial Soil	5.4**	Low %	Low
Ethylbenzene*	Contents remaining in pipe	10.9 mg/kg	230† – Residential Soil 230† – Industrial Soil	10**	Low %	Low
Xylenes*	Contents remaining in pipe	108.6 mg/kg	210† – Residential Soil 210† – Industrial Soil	7**	Low %	Low

* The proportion of benzene, toluene, ethylbenzene, and xylene in the diesel fuel was obtained from Environmental Technology Centre – "Properties of Crude Oils and Oil Products: Diesel Fuel" (see Reference 3)

† = PRG (Environmental Protection Agency [EPA] Region 9)

** = Idaho Risk Based Corrective Action Guidance Document, Tier 0 soil cleanup levels (see Reference 4)

% = Although estimated concentrations exceed risk-based concentrations in the fuel oil, there is no exposure pathway for human or ecological exposure, so risk is assessed as "low."



RI/FS = remedial investigation/feasibility study

- Risk associated with the Diesel fuel Line

NOTE: Industrial institutional controls will be required until the site is deactivated and the risk evaluated.

NOTE: Risk from the contaminated area between TRA-57 and PW-13 has not been evaluated and warrants further investigation.

PROCESS Abandoned Pipeline

Question 1. What are the waste generation process locations and dates of operation associated with this site?

Block 1 Answer:

There are currently no waste generation processes associated with this site. The diesel fuel line was installed between 1955 and 1958 and was abandoned in the early 1980s. This line was used to transfer diesel fuel.

Block 2 How reliable are the information sources? X High __Med __Low (check one)

Explain the reasoning behind this evaluation.

The information regarding the diesel fuel line with regard to waste generation processes is considered highly reliable. The New Site Identification Form (NSID)[5] identifies that this line was used for diesel fuel and specifies the time frame that the diesel fuel line was in operation. In addition, Mr. George Swaney[6] stated that the line was blind flanged at the source, in TRA-627. A visual inspection of the line was conducted on September 21, 2000; the line was blind flanged.

Block 3 Has this INFORMATION been confirmed? X Yes __No (check one)

If so, describe the confirmation.

The information regarding the use and dates of operation of the diesel fuel line is well documented and is considered highly reliable.

Block 4 **Sources of Information** (check appropriate box[es] & source number from reference list)

No available information	[ ]	Analytical data	[ ]
Anecdotal	[ ]	Documentation about data	[ ]
Historical process data	[ ]	Disposal data	[ ]
Current process data	[ ]	QA data	[ ]
Areal photographs	[ ]	Safety analysis report	[ ]
Engineering/site drawings	[X] 10,12	D&D report	[ ]
Unusual Occurrence Report	[ ]	Initial assessment	[X] 5
Summary documents	[ ]	Well data	[ ]
Facility SOPs	[ ]	Construction data	[ ]
OTHER	[X] 6		

PROCESS Abandoned Pipeline

Question 2. What are the disposal process locations and dates of operation associated with this site?

Block 1 Answer:

There are no disposal processes associated with this site. The diesel fuel line was installed between 1955 and 1958 and was abandoned in the early 1980s. The pipeline was never used for disposal.

Block 2 How reliable are the information sources? X High __Med __Low (check one)

Explain the reasoning behind this evaluation.

The information regarding the diesel fuel line is considered highly reliable. The NSID[5] identifies the time frame that the diesel fuel line was in operation and describes the function of the diesel fuel line. In addition, Mr. George Swaney[6] stated that the line was used for diesel fuel, but is currently blind flanged at the source, in TRA-627. A visual inspection of the line was conducted on September 21, 2000; the line was blind flanged.

Block 3 Has this INFORMATION been confirmed? X Yes __No (check one)

If so, describe the confirmation.

The information regarding the function of the diesel fuel line is well documented and is considered highly reliable.

Block 4 **Sources of Information** (check appropriate box[es] & source number from reference list)

No available information	[ ]	Analytical data	[ ]
Anecdotal	[ ]	Documentation about data	[ ]
Historical process data	[ ]	Disposal data	[ ]
Current process data	[ ]	QA data	[ ]
Areal photographs	[ ]	Safety analysis report	[ ]
Engineering/site drawings	[X] 10,12	D&D report	[ ]
Unusual Occurrence Report	[ ]	Initial assessment	[X] 5
Summary documents	[ ]	Well data	[ ]
Facility SOPs	[ ]	Construction data	[ ]
OTHER	[X] 6		

PROCESS Abandoned Pipeline

Question 3. Is there empirical, circumstantial, or other evidence of migration? If so, what is it?

Block 1 Answer:

Yes, there is evidence of migration.

The diesel fuel line originates at the TRA Fuel Oil Pump House (TRA-627), which is located near the northern perimeter of TRA. The line extends approximately 579 m (1,900 ft) to the south and branches to three facilities: TRA-643, TRA-648, and TRA-656. Small quantities of the diesel fuel were used in an experimental process to lubricate compressors at TRA-643. Small quantities of the diesel fuel were also used to fuel space heaters at TRA-656. The bulk of the diesel fuel was used to operate a diesel generator in TRA-648. Two day tanks were used to provide fuel to the three facilities because the length of the pipeline caused the diesel fuel flow rate to be slow. These tanks were filled automatically, as needed, via pumps at TRA-627 and the diesel fuel line.

According to Mr. Harry Williams[1], the former ETR shift supervisor, the TRA-648 diesel generator stopped operating in 1981 because it was not receiving any fuel. This prompted the excavation of the diesel fuel line in 1981. The diesel fuel line was excavated, a leak was identified, and the pipeline was repaired by reconfiguring it to utilize an abandoned nearby section of an underground steam line. There has been no evidence of leaks in the diesel fuel line since the early 1980s. On December 3, 1990, a "Tracer Tight" test was performed on the reconfigured diesel fuel line and its integrity was confirmed. The results of the test indicated no leaks in the line. The excavated area can be identified at TRA-57 by newer paving over a long, narrow area to the east of TRA-648.

A total of two leaks from the diesel fuel line was reported in the early 1980s, as indicated in the *Preliminary Scoping Track 2 Summary Report for the Test Reactor Area Operable Unit 2-04: Fuel Spills*[2]. One leak occurred in approximately 1980, and the other occurred in late 1981. Further conversation with Mr. Williams revealed that the tracer test performed in 1990 was conducted on this reconfigured line and not on the original, which had leaked. This information was not known or included in the original Track 2 investigation. Mr. Williams stated that ETR operated for specific periods of a few months, with about a year between each operation period, and the pumps in TRA-627 ran automatically. In addition, the diesel fuel line serviced three different facilities for three different operations. During the Track 2 investigation, no information regarding the consumption rates for the diesel fuel could be located.

During the drilling of monitoring wells for the investigation of the TRA Perched Water System, a petroleum odor was noted in one of the wells (PW-13 monitoring well). PW-13, at its nearest point, is located 18 m (60 ft) south of the TRA-57 diesel fuel line. There are no other petroleum transfer lines or tanks located within 549 m (1,800 ft) of the PW-13 monitoring well.

Samples of the product were taken from PW-13, and results of the analysis for the petroleum sample, dated October 5, 1990, identified it as either Number 1 or Number 2 diesel oil. On September 19, 1990, the petroleum product layer was observed to be approximately 3.0-m (8.5-ft) thick, extending from the 20-m (66.5-ft) level to the 23-m (75-ft) level, and floating atop the perched water zone. The diesel fuel was bailed from the corehole; after 24 hours, approximately 0.30 m (1 ft) of additional free product had seeped into the corehole. By November 1990, approximately 76 L (20 gal) of diesel had been removed from PW-13. PW-13 was completed to a total depth of 27 m (90 ft) below the ground surface on November 8, 1990.

Between November 1990 and March 1994, occasional monitoring was performed with no further detection of diesel. The Preliminary Scoping Track 2 Summary Report[2] was completed for PW-13 on March 25, 1994. The recommendation in the report was that the status of the PW-13 monitoring well, as it relates to the diesel contamination, should be changed to no further action. In addition, it stated that since there is no continuing contamination and no source is in evidence, the site does not present an unacceptable risk. At the time of the investigation, the source of diesel was unknown. Complicating the issue was the information gained from the tracer test; the source of diesel was not suspected to be the TRA-57 pipeline because the test proved the line's integrity. What was not known was that the line had been reconfigured and had in fact leaked.

Since construction of PW-13, occasional monitoring has continued. From February through September 2000, diesel fuel was again detected in PW-13. The largest amount of product was approximately 41 cm (16 in.), detected in February, and the smallest amount was a trace of product, detected in August. The water level fluctuates seasonally, and it appears that there is a correlation between water level and product thickness.

The source of the diesel fuel in PW-13 is unknown. In Occurrence Report EGG-TRA-1990-0002[7], it was postulated that corrosion caused a breach of the ETR diesel fuel line while it was in service, allowing diesel fuel to migrate through the alluvial strata and along fractures in the basalt layer. Eventually the diesel fuel accumulated at the top of the deep perched water zone in a localized pocket at a depth of 23 m (75 ft). This scenario seems to be likely when compared to the information obtained from Mr. Williams[1].

New information provided by Mr. Williams that was not known at the time of the Track 2 investigation or signature of the ROD indicates that while the initial investigation concluded that a large release was not suspected due to the integrity of the pipeline based on the "tracer test," in fact, the pipeline had leaked prior to the reconfiguration of the diesel line through the steam line. This new information also suggests that a sizeable amount of diesel (in excess of hundreds of gallons) could have been released to the environment in the 1980 spill. The risk from this spill requires further evaluation.

Block 2 How reliable are the information sources? X High __Med __Low (check one)

Explain the reasoning behind this evaluation.

The information regarding the diesel fuel contamination is highly reliable. The presence of diesel fuel in PW-13 is documented in Occurrence Report EGG-TRA-1990-0002[7], and the subsequent investigation is documented in *Preliminary Scoping Track 2 Summary Report for the Test Reactor Area Operable Unit 2-04: Fuel Spills*[2]. New information from Mr. Williams is based upon first hand knowledge.

Block 3 Has this INFORMATION been confirmed? X Yes __ No (check one)

If so, describe the confirmation.

The information regarding the presence of contamination in PW-13 is well documented and is considered highly reliable.

Block 4 **Sources of Information** (check appropriate box[es] & source number from reference list)

No available information	[ ] ____	Analytical data	[ ] ____
Anecdotal	[ ] ____	Documentation about data	[ ] ____
Historical process data	[ ] ____	Disposal data	[ ] ____
Current process data	[ ] ____	QA data	[ ] ____
Areal photographs	[ ] ____	Safety analysis report	[ ] ____
Engineering/site drawings	[ ] ____	D&D report	[ ] ____
Unusual Occurrence Report	[X] 7	Initial assessment	[X] 5
Summary documents	[X] 2	Well data	[ ] ____
Facility SOPs	[ ] ____	Construction data	[ ] ____
OTHER	[X] 10		

PROCESS Abandoned Pipeline

Question 4. Is there evidence that a source exists at this site? If so, list the sources and describe the evidence.

Block 1 Answer:

Yes, there is evidence that a source exists at this site. The former diesel fuel line is still located beneath the ground surface at this site, but has not been used since the early 1980s. The line was used to transfer diesel fuel from the TRA-727C, TRA-727D, and TRA-775 diesel fuel tanks to TRA-643, TRA-648, and TRA-656. The pipeline is separated and blind flanged at TRA-627 and is believed to be capped at each of the three branches (TRA-643, TRA-648, and TRA-656).

This remaining line, approximately 580 m (1,900 ft) of 5.08-cm (2-in.) carbon steel pipe between TRA-627 and ETR (TRA-643, TRA-648, and TRA-656), can be considered a potential source of contamination. It may contain diesel fuel, but the total quantity that may be contained within the line is unknown. However, the pipe is intact, and there is no evidence of corrosion of the diesel fuel line in areas visible to inspection. In addition, on December 3, 1990, a "Tracer Tight" test was performed on the newly configured diesel fuel line and its integrity was confirmed. The results of the test indicated no leaks in the line.

The recent detection of diesel fuel (February through September 2000) at PW-13 is evidence that a large area of contamination may exist that requires further investigation.

Block 2 How reliable are the information sources? X High __Med __Low (check one)

Explain the reasoning behind this evaluation.

The information regarding the diesel fuel line is considered highly reliable. The NSID[5] identifies the time frame that the diesel fuel line was in operation and summarizes the actions taken regarding the line. The *Preliminary Scoping Track 2 Summary Report for the Test Reactor Area Operable Unit 2-04: Fuel Spills*[2] verifies that a leak test was performed on the newly configured line in 1990.

Mr. George Swaney[6] stated that the line was blind flanged at the source, in TRA-627. A visual inspection of the line was conducted on September 21, 2000; the line was blind flanged.

Block 3 Has this INFORMATION been confirmed? X Yes __No (check one)

If so, describe the confirmation.

The information regarding the source at TRA-57 (the diesel fuel line) is well documented and is considered highly reliable.

Block 4 **Sources of Information** (check appropriate box[es] & source number from reference list)

No available information	[ ] ____	Analytical data	[ ] ____
Anecdotal	[ ] ____	Documentation about data	[ ] ____
Historical process data	[ ] ____	Disposal data	[ ] ____
Current process data	[ ] ____	QA data	[ ] ____
Areal photographs	[ ] ____	Safety analysis report	[ ] ____
Engineering/site drawings	[X] 10,12	D&D report	[ ] ____
Unusual Occurrence Report	[ ] ____	Initial assessment	[X] 5
Summary documents	[X] 2	Well data	[ ] ____
Facility SOPs	[ ] ____	Construction data	[ ] ____
OTHER	[X] 6		

PROCESS Abandoned Pipeline

Question 5. Does site operating or disposal historical information allow estimation of the pattern of potential contamination? If the pattern is expected to be a scattering of hot spots, what is the expected minimum size of a significant hot spot?

Block 1 Answer:

Currently, the diesel fuel line is not suspected to be leaking. However, an estimate of the potential contamination for the diesel fuel release that occurred in 1980 is approximately 7,571 L (2,000 gal).

The minimum size of the plume was estimated as follows:

The TRA-57 diesel fuel line released an unknown quantity of diesel fuel in 1980. Diesel fuel was detected in PW-13, located approximately 18 m (60 ft) from the diesel fuel line at its closest point. Although it has not been confirmed, the suspected source of contamination for PW-13 was the diesel fuel line.

From the Operable Unit 2-13 Groundwater Monitoring Plan[8], Figure 2-7, the gradient on the Deep Perched Water System is not steep in this area, so it can be assumed that in 18 horizontal meters (60 horizontal feet), there is no significant change in groundwater elevation or product thickness.

The estimated quantity of fuel released to the environment as a result of the leaking fitting was calculated in the following manner. The known flow rate of the pumps located at TRA-627 (15 to 25 gallons per hour [gph]) multiplied by the time expended between the observation that the day tank was not filling and the shutdown of the pump plus the holding capacity of the 3-in. diameter piping run from the point of the leak back to TRA-627. The result of the calculation was that the estimated quantity of the release was approximately 7,571 L (2,000 gal).

Block 2 How reliable are the information sources? X High __Med __Low (check one)

Explain the reasoning behind this evaluation.

The information regarding the diesel fuel contamination is highly reliable. The presence of diesel fuel in PW-13 is documented in Occurrence Report EGG-TRA-1990-0002[7], and the subsequent investigation is documented in *Preliminary Scoping Track 2 Summary Report for the Test Reactor Area Operable Unit 2-04: Fuel Spills*[2]. New information from Mr. Williams is based upon first hand knowledge.

Block 3 Has this INFORMATION been confirmed? X Yes __No (check one)

If so, describe the confirmation.

The information regarding the presence of contamination in PW-13 is well documented and is considered highly reliable.

Block 4 **Sources of Information** (check appropriate box[es] & source number from reference list)

No available information	[ ]	Analytical data	[ ]
Anecdotal	[ ]	Documentation about data	[ ]
Historical process data	[ ]	Disposal data	[ ]
Current process data	[ ]	QA data	[ ]
Areal photographs	[ ]	Safety analysis report	[ ]
Engineering/site drawings	[ ]	D&D report	[ ]
Unusual Occurrence Report	[X] 7	Initial assessment	[X] 5
Summary documents	[X] 2	Well data	[ ]
Facility SOPs	[ ]	Construction data	[ ]
OTHER	[X] 1		

PROCESS Abandoned Pipeline

Question 6. Estimate the length, width, and depth of the contaminated region. What is the known or estimated volume of the source? If this is an estimated volume, explain carefully how the estimate was derived.

Block 1 Answer:

The estimated contaminated region from the 1980 release is given in Question 5. Currently, the diesel oil line is not suspected to be leaking. However, an estimate of the potential leak of the existing contents in the pipeline is provided.

The estimated volume of the pipeline is 1,176 L (310.5 gal). The line is approximately 580 m (1,900 ft) of 5.08-cm (2-in.) carbon steel pipe between TRA-627 and TRA-643, TRA-648, and TRA-656. The maximum amount of hazardous substance/constituent was estimated by

$V = \pi r^2 L$, where:

Pi (π) = 3.14
r = the radius of the pipe
L = the length of the pipe.

Therefore, the maximum volume of the pipe is 1.176 m^3 (41.45 ft^3). Converting this to liters and gallons (where 1 L = 1.0 x 10^{-3} m^3 and 1 gallon = 3.786 L), then the volume of the pipe is estimated to be 1,176 L (310.5 gal). This number is very conservative. It is unknown whether corroded portions of the pipe wall exist, resulting in a thinner pipe wall, and a larger volume within the pipeline. Therefore, the thickness of the pipe walls was not taken into consideration and subtracted from the pipe diameter prior to the calculation.

Block 2 How reliable are the information sources? X High __Med __Low (check one)

Explain the reasoning behind this evaluation.

The information regarding the diesel fuel contamination is highly reliable. The presence of diesel fuel in PW-13 is documented in Occurrence Report EGG-TRA-1990-0002[7], and the subsequent investigation is documented in *Preliminary Scoping Track 2 Summary Report for the Test Reactor Area Operable Unit 2-04: Fuel Spills*[2]. New information from Mr. Williams is based upon first hand knowledge.

Block 3 Has this INFORMATION been confirmed? X Yes __No (check one)

If so, describe the confirmation.

The information regarding the presence of contamination in PW-13 is well documented and is considered highly reliable.

Block 4 **Sources of Information** (check appropriate box[es] & source number from reference list)

No available information	[ ] ____	Analytical data	[ ] ____
Anecdotal	[ ] ____	Documentation about data	[ ] ____
Historical process data	[ ] ____	Disposal data	[ ] ____
Current process data	[ ] ____	QA data	[ ] ____
Areal photographs	[ ] ____	Safety analysis report	[ ] ____
Engineering/site drawings	[X] 12	D&D report	[ ] ____
Unusual Occurrence Report	[X] 7	Initial assessment	[X] 5
Summary documents	[X] 2	Well data	[ ] ____
Facility SOPs	[ ] ____	Construction data	[ ] ____
OTHER	[X] 1		

PROCESS Abandoned Pipeline

Question 7. What is the known or estimated quantity of hazardous substance/constituent at this source? If the quantity is an estimate, explain carefully how the estimate was derived.

Block 1 Answer:

The estimated maximum quantity of hazardous substance/constituent at this source would be the total amount of diesel fuel that could be contained within the diesel fuel line. This amount is 1,176 L (310.5 gal).

The line currently contains a fuel blend of #1 and #2 diesel fuel. The line is approximately 580 m (1,900 ft) of 5.08-cm (2-in.) carbon steel pipe between TRA-627 and TRA-643, TRA-648, and TRA-656.

The maximum amount of hazardous substance/constituent that could be contained within the diesel fuel line was estimated by

$V = \pi r^2 L$, where:

Pi (π) = 3.14
r = the radius of the pipe
L = the length of the pipe.

Therefore, the maximum volume of diesel fuel that could be contained within the pipe is 1.176 m^3 (41.45 ft^3). Converting this to liters and gallons (where 1 L = 1.0×10^{-3} m^3 and 1 gallon = 3.786 L), then the maximum volume of diesel fuel that could be contained within the pipe is estimated to be 1,176 L (310.5 gal).

Block 2 How reliable are the information sources? __High X Med __Low (check one)

Explain the reasoning behind this evaluation.

The information regarding the diesel fuel line is considered highly reliable. The NSID[5] identifies the time frame that the diesel fuel line was in operation and summarizes the actions taken regarding the line. However, there is no documentation available that gives the quantity of diesel fuel that is currently contained within the pipeline.

Block 3 Has this INFORMATION been confirmed? X Yes __No (check one)

If so, describe the confirmation.

The information regarding the diesel fuel pipeline is well documented and is confirmed by a number of sources.

Block 4 **Sources of Information** (check appropriate box[es] & source number from reference list)

No available information	[ ] ____	Analytical data	[ ] ____
Anecdotal	[ ] ____	Documentation about data	[ ] ____
Historical process data	[ ] ____	Disposal data	[ ] ____
Current process data	[ ] ____	QA data	[ ] ____
Areal photographs	[ ] ____	Safety analysis report	[ ] ____
Engineering/site drawings	[X] 10,12	D&D report	[ ] ____
Unusual Occurrence Report	[ ] ____	Initial assessment	[X] 5
Summary documents	[ ] ____	Well data	[ ] ____
Facility SOPs	[ ] ____	Construction data	[ ] ____
OTHER	[X] 11,6		

PROCESS Abandoned Pipeline

Question 8. Is there evidence that this hazardous substance/constituent is present at the source as it exists today? If so, describe the evidence.

Block 1 Answer:

Yes, there is evidence that the hazardous substance/constituent is present at the source as it exists today. The former diesel fuel line is still located beneath the ground surface at this site and contains an undetermined quantity of diesel fuel. The estimated maximum quantity of diesel at the source is estimated to be 1,176 L (310.5 gal). See Question 7.

The recent detection of diesel fuel in February through September 2000 at PW-13 is evidence that suggests a large area of contamination may exist that requires further investigation.

Block 2 How reliable are the information sources? X High __Med __Low (check one)

Explain the reasoning behind this evaluation.

The information regarding the diesel fuel line is considered highly reliable. The NSID[5] identifies the time frame that the diesel fuel line was in operation and summarizes the actions taken regarding the line. The *Preliminary Scoping Track 2 Summary Report for the Test Reactor Area Operable Unit 2-04: Fuel Spills*[2] verifies that a leak test was performed on the line in 1990. Mr. George Swaney[6] stated that the line was blind flanged at the source, in TRA-627. A visual inspection of the line was conducted on September 21, 2000; the line was blind flanged.

Block 3 Has this INFORMATION been confirmed? X Yes __No (check one)

If so, describe the confirmation.

The information regarding the diesel fuel line is well documented, and is considered highly reliable.

Block 4 **Sources of Information** (check appropriate box[es] & source number from reference list)

No available information	[ ]	Analytical data	[ ]
Anecdotal	[ ]	Documentation about data	[ ]
Historical process data	[ ]	Disposal data	[ ]
Current process data	[ ]	QA data	[ ]
Areal photographs	[ ]	Safety analysis report	[ ]
Engineering/site drawings	[X] 10,12	D&D report	[ ]
Unusual Occurrence Report	[X]	Initial assessment	[X] 5
Summary documents	[X] 2	Well data	[ ]
Facility SOPs	[ ]	Construction data	[ ]
OTHER	[X] 6		

References for Decision Documentation Package

1. Personal communication with Mr. Harry Williams, Former ETR Shift Supervisor, October 6, 2000.

2. Idaho National Engineering Laboratory, *Preliminary Scoping Track 2 Summary Report for the Test Reactor Area Operable Unit 2-04: Fuel Spills* EGG-ER-11110, Revision 2, January 1994.

3. Environmental Technology Centre, "Properties of Crude Oils and Oil Products: Diesel Fuel," www.ETCentre.org/cgi-win/oil_prop_cgi.exe, September 28, 2000.

4. Idaho Division of Environmental Quality, "Idaho Risk-Based Corrective Action (RBCA) Cleanup Requirements for Petroleum Releases."

5. R.S. Cain, New Site Identification Form for Abandoned Buried Diesel Fuel Line (TRA-57), March 1999.

6. Personal Communication with Mr. George Swaney, TRA Environmental Engineer, September 21, 2000.

7. A.H. Clark, *Occurrence Report: Discovery of a Petroleum Product While Drilling a Monitoring Well (PW-13)*, EGG-TRA-1990-0002, September 27, 1993.

8. Department of Energy Idaho Operations Office, *Groundwater Monitoring Plan for the Test Reactor Area Operable Unit 2-13*, DOE/ID-10626, Revision 1, July 2000.

9. American Society for Testing and Materials, "Standard Specification for Diesel Fuels," Designation : D 975–98B, December 10, 1998.

10. B. Brawn, "MTR: Fuel Oil Pump House and Tank Farm Flow Diagram," Drawing No. MTR-D-4679, March 1959 (origination date).

11. Department of Energy Idaho Operations Office, *Track 1 Sites: Guidance for Assessing Low Probability Hazard Sites at the INEL*, DOE/ID-10340, Revision 1, July 1992.

12. R.A. Friesz, "TRA Underground Piping Project: Miscellaneous Fuel, Acids, and Air Lines," Drawing No. 448549, September 1993 (origination date).

13. Todd, "Groundwater Hydrology," John Wiley and Sons, 1980.

ATTACHMENT A

PW13NUINFO 8/2/01

WASTE AREA GROUP 2 - TEST REACTOR AREA

NEW INFORMATION AND RECOMMENDATION ON POTENTIAL DIESEL RELEASE NEAR WELL PW-13

Introduction

This report presents the results of recent groundwater monitoring performed at Test Reactor Area (TRA) Well PW-13. Also presented is new information about the most probable source of the diesel contamination in the vicinity of the well. Based on this new and previous groundwater sampling, monitoring and release information, a recommendation for a limited continuation of this investigation for the diesel at Well PW-13 is presented. The results of a risk-based study are included in this report to support the recommendation.

Potential Source of the Diesel Release

Diesel was used to fuel various emergency generators at TRA. The source of the contamination could have been various leaks or spills that occurred in the vicinity of the Well PW-13 location. The most probable source was the failure of the Engineering Test Reactor (ETR) diesel transfer line in 1981. This line originated at the north end of TRA at the Oil Pump House (Materials Test Reactor [MTR]-627) with the diesel feed originating from the Diesel Fuel Storage Tanks (TRA-727C, -727D, and -775). Tanks TRA-727C and -775 each have a capacity of 113,562 L (30,000 gal), while Tank TRA-727D has capacity of 264,979 L (70,000 gal). The 5.08-cm (2-in.) carbon steel line extended 655 m (2,150 ft) south and then west to the 5,678-L (1,500-gal) ETR Diesel Fuel Day Tank (ETR-648-3) situated near the southeast end of TRA. It should be noted that in several documents the day tank is erroneously referred to by the number ETR-648-33. The majority of this pipe was installed approximately 1.2 to 1.5 m (4 to 5 ft) below grade.

During operation of ETR, the diesel emergency generator was continuously online to serve as a source of backup power for reactor shutdown. The generator was fueled from the diesel day tank with fuel being transferred from the storage tanks at the north end by Diesel Oil Transfer Pumps (431-21A and 431-21B) to maintain the supply in the day tank. The transfer rate for the pumps was 15 to 25 gallons per hour (gph). The operating logic of the ETR system was such that failure or shutdown of the emergency diesel generator resulted in shutting the reactor down.

A former ETR Reactor Coordinator/Reactor Supervisor (1980) provided the following information outlining the scenario of the leak (Williams 2001). Near the end of the final run of ETR in 1981, it was found that refilling the diesel day tank was impossible; diesel could not be transferred to the tank even though the transfer pumps were operating at full capacity. It was postulated that a major leak had occurred in the diesel transfer system over a very short period of time. To locate and repair the leak, the first action taken was to excavate and inspect the Diesel Fuel Day Tank (ETR-648-3). The tank was found to be sound with no leaks. Next, the transfer line was excavated, starting from the day tank end of the line. The leak was discovered in an elbow joint where the line changed direction to the west at the south end of the ETR facility. This failure occurred in a location approximately 18 m (60 ft) northwest of Well PW-13. The day tank itself was located approximately 107 m (350 ft) west, northwest of Well PW-13. Since this was the last scheduled run for ETR, emergency repairs of the line were accomplished by bridging the leaking pipe section using a portion of an existing, inactive steam line.

Taking into account several factors, it is estimated that the maximum amount of diesel fuel, which could have been discharged during the time between when the leak was discovered and repairs were completed, was approximately 7,571 L (2,000 gal). Other factors considered in the estimation process include the way the emergency diesel system was operated and the assumed maximum rates for the diesel transfer pumps.

Current Status

Subsequent to the initial discovery of contamination during the drilling of Well PW-13, a series of five additional water samples was collected from the well under Operable Unit (OU) 2-12 between July 1993 and October 1995. Each of these samples was submitted for benzene, toluene, ethylbenzene, and xylene (BTEX) analysis. The only constituent found was ethylbenzene, which was found in four of the five samples. The individual sample results are included in Table 1 that follows. The presence of ethylbenzene had also been associated with the presence of diesel #2 during an earlier sampling round of Well PW-13. Data from this series of samples, in conjunction with the corresponding water level measurements in Well PW-13, suggested that the appearance of ethylbenzene in the well was dependent upon the well's water level. This organic indicator compound was detected when the water level rose to approximately 22 m (73 ft) below land surface (bls), but could not be detected when the water level was below 23 m (74 ft) bls. It was postulated that at the higher water levels, residual diesel soil contamination, which may exist in a soil smear zone between 22 and 23 m (73 and 74 ft) bls, mixed with the water and entered the well.

Because of continued observation of odors emanating from Well PW-13 in the fall of 1999, steps were initiated to determine not only the occurrence and extent of contamination, but also the type and source of the contamination. The initiation of these efforts was previously reported to the Agencies in the course of routine Department of Energy/Agency communications. The most persistent observations have been of a diesel-like or petroleum-like odor from the well during water level monitoring events or well maintenance activities.

Routine monitoring of Well PW-13 has commenced, and several water level measurements have now been compiled. The historic records of previous observations have been researched and their information added to the database. The compiled water level data are presented in Figure 1 that follows, and the data, along with comments, are shown in Table 2.

Table 1

PW-13 SAMPLE RESULTS

SAMPLE	SAMPLE DATE	ANAL GROUP	ANALYTE	CONC	QUAL FLAG	UNITS
PW-13	15-Jul-93	BTEX	Ethylbenzene	5.4		ug/L
PW-13	15-Oct-93	BTEX	Ethylbenzene	5.4		ug/L
PW-13	15-Oct-93	BTEX	Ethylbenzene	5.2		ug/L
PW-13	15-Jan-94	BTEX	Ethylbenzene	3.6		ug/L
PW-13	15-Jan-94	BTEX	Ethylbenzene	4.5		ug/L
PW-13	15-Apr-94	BTEX	Ethylbenzene	4.3	U	ug/L
PW-13	15-Oct-95	BTEX	Ethylbenzene	3.6		ug/L
PW-13	20-Nov-00	VOA	Xylenes (total)	1	J	ug/L
PW-13	20-Nov-00	VOA	TIC: Unknown	48	JN	ug/L
PW-13	20-Nov-00	VOA	TIC: Unknown C9H12	22	JN	ug/L
PW-13	20-Nov-00	VOA	TIC: Unknown C10H14	16	JN	ug/L
PW-13	20-Nov-00	VOA	TIC: Unknown C10H14	15	JN	ug/L
PW-13	20-Nov-00	VOA	TIC: Unknown C10H14	24	JN	ug/L
PW-13	20-Nov-00	VOA	TIC: Unknown C10H14	15	JN	ug/L
PW-13	20-Nov-00	VOA	TIC: Unknown C10H12	22	JN	ug/L
PW-13	20-Nov-00	VOA	TIC: Unknown C11H14	23	JN	ug/L
PW-13	20-Nov-00	VOA	TIC: Unknown C11H14	13	JN	ug/L
PW-13	20-Nov-00	VOA	TIC: Naphthalene	23	JN	ug/L
PW-13	20-Nov-00	VOA	TIC: Unknown	20	JN	ug/L
PW-13	20-Nov-00	SVOC	Naphthalene	10	U	ug/L
PW-13	20-Nov-00	SVOC	2-Methylnaphthalene	10	U	ug/L
PW-13	20-Nov-00	SVOC	Acenaphthylene	10	U	ug/L
PW-13	20-Nov-00	SVOC	Acenaphthene	1.8	J	ug/L
PW-13	20-Nov-00	SVOC	Fluorene	2.6	J	ug/L
PW-13	20-Nov-00	SVOC	Phenanthrene	2.2	J	ug/L
PW-13	20-Nov-00	SVOC	Anthracene	10	U	ug/L
PW-13	20-Nov-00	SVOC	Fluoranthene	10	U	ug/L
PW-13	20-Nov-00	SVOC	Pyrene	10	U	ug/L
PW-13	20-Nov-00	SVOC	Benzo (a) anthracene	10	U	ug/L
PW-13	20-Nov-00	SVOC	Chrysene	10	U	ug/L
PW-13	20-Nov-00	SVOC	Benzo (b) fluoranthene	10	U	ug/L
PW-13	20-Nov-00	SVOC	Benzo (k) fluoranthene	10	U	ug/L
PW-13	20-Nov-00	SVOC	Benzo (a) pyrene	10	U	ug/L
PW-13	20-Nov-00	SVOC	Indeno (1,2,3-cd) pyrene	10	U	ug/L
PW-13	20-Nov-00	SVOC	Dibenzo (a,h) anthracene	10	U	ug/L
PW-13	20-Nov-00	SVOC	Benzo (g,h,i) perylene	10	U	ug/L
PW-13	20-Nov-00	SVOC	TIC: 1-Methyl-4-(1-methyl) benzene	7.1	JN	ug/L
PW-13	20-Nov-00	SVOC	TIC: 4-Ethyl-1-2-dimethyl) benzene	3.8	JN	ug/L
PW-13	20-Nov-00	SVOC	TIC: 1-Methyl-2-(1-methyl) benzene	6.6	JN	ug/L
PW-13	20-Nov-00	SVOC	TIC: Unknown	7.3	JN	ug/L
PW-13	20-Nov-00	SVOC	TIC: Unknown	4.1	JN	ug/L
PW-13	20-Nov-00	SVOC	TIC: 2,6,10-Trimethyldodecane	5.0	JN	ug/L

Table 1 (Cont'd)

SAMPLE	SAMPLE DATE	ANAL GROUP	ANALYTE	CONC	QUAL FLAG	UNITS
PW-13	20-Nov-00	SVOC	TIC: Tetradecane	4.7	JN	ug/L
PW-13	20-Nov-00	SVOC	TIC: Unknown	5.9	JN	ug/L
PW-13	20-Nov-00	SVOC	TIC: Pentadecane	6.3	JN	ug/L
PW-13	20-Nov-00	SVOC	TIC: 1, 6, 7-Trimethylnaphthalene	6.4	JN	ug/L
PW-13	20-Nov-00	SVOC	TIC: Hexadecane	7.3	JN	ug/L
PW-13	20-Nov-00	SVOC	TIC: 1-Methyl (9h) fluorene	5.4	JN	ug/L
PW-13	20-Nov-00	SVOC	TIC: Octadecane	8.9	JN	ug/L
PW-13	20-Nov-00	SVOC	TIC: 2,6,10,14-Tetramethylhexadecane	5.1	JN	ug/L
PW-13	20-Nov-00	SVOC	TIC: Nonadecane	7.4	JN	ug/L
PW-13	20-Nov-00	SVOC	TIC: Hexadecanoic acid	8.7	JN	ug/L
Purge Water	04-Jun-01	TPH Diesel	Diesel	7,300		ug/L
Purge Water	04-Jun-01	TPH Diesel	Kerosene	250	U	ug/L
Purge Water	04-Jun-01	TPH Diesel	JP-4	250	U	ug/L
Purge Water	04-Jun-01	TPH Diesel	Naphtha	250	U	ug/L
Purge Water	04-Jun-01	TPH Diesel	#6 Fuel Oil	2,000	U	ug/L
Purge Water	04-Jun-01	TPH Diesel	Miscellaneous	250	U	ug/L
Purge Water	04-Jun-01	TPH Diesel	Diesel	83,000		ug/L
Purge Water	04-Jun-01	TPH Diesel	Kerosene	5,000	U	ug/L
Purge Water	04-Jun-01	TPH Diesel	JP-4	5,000	U	ug/L
Purge Water	04-Jun-01	TPH Diesel	Naphtha	5,000	U	ug/L
Purge Water	04-Jun-01	TPH Diesel	#6 Fuel Oil	40,000	U	ug/L
Purge Water	04-Jun-01	TPH Diesel	Miscellaneous	5,000	U	ug/L
Purge Water	04-Jun-01	TPH Gasoline	Gasoline Range Organics	40		ug/L
Purge Water	04-Jun-01	TPH Gasoline	Gasoline Range Organics	21,000		ug/L
Purge Water	04-Jun-01	BTEX	Benzene	0.6	J	ug/L
Purge Water	04-Jun-01	BTEX	Toluene	1	U	ug/L
Purge Water	04-Jun-01	BTEX	Ethylbenzene	1	U	ug/L
Purge Water	04-Jun-01	BTEX	Total Xylenes	2		ug/L
Purge Water	04-Jun-01	BTEX	Benzene	10	U	ug/L
Purge Water	04-Jun-01	BTEX	Toluene	10	U	ug/L
Purge Water	04-Jun-01	BTEX	Ethylbenzene	10	U	ug/L
Purge Water	04-Jun-01	BTEX	Total Xylenes	10	U	ug/L
Contaminant	04-Jun-01	TPH Diesel	Diesel	84,000		ug/L
Contaminant	04-Jun-01	TPH Diesel	Kerosene	5,000	U	ug/L
Contaminant	04-Jun-01	TPH Diesel	JP-4	5,000	U	ug/L

Table 1 (Cont'd)

SAMPLE	SAMPLE DATE	ANAL GROUP	ANALYTE	CONC	QUAL FLAG	UNITS
Contaminant	04-Jun-01	TPH Diesel	Naphtha	5,000	U	ug/L
Contaminant	04-Jun-01	TPH Diesel	#6 Fuel Oil	40,000	U	ug/L
Contaminant	04-Jun-01	TPH Diesel	Miscellaneous	5,000	U	ug/L
Contaminant	04-Jun-01	TPH Diesel	Diesel	25,000		ug/L
Contaminant	04-Jun-01	TPH Diesel	Kerosene	2,500	U	ug/L
Contaminant	04-Jun-01	TPH Diesel	JP-4	2,500	U	ug/L
Contaminant	04-Jun-01	TPH Diesel	Naphtha	2,500	U	ug/L
Contaminant	04-Jun-01	TPH Diesel	#6 Fuel Oil	20,000	U	ug/L
Contaminant	04-Jun-01	TPH Diesel	Miscellaneous	2,500	U	ug/L
Contaminant	04-Jun-01	TPH Gasoline	Gasoline Range Organics	110,000		ug/L
Contaminant	04-Jun-01	TPH Gasoline	Gasoline Range Organics	170,000		ug/L
Contaminant	04-Jun-01	TPH Gasoline	Gasoline Range Organics	250,000		ug/L
Contaminant	04-Jun-01	TPH Gasoline	Gasoline Range Organics	180,000		ug/L
Contaminant	04-Jun-01	BTEX	Benzene	10	U	ug/L
Contaminant	04-Jun-01	BTEX	Toluene	10	U	ug/L
Contaminant	04-Jun-01	BTEX	Ethylbenzene	10	U	ug/L
Contaminant	04-Jun-01	BTEX	Total Xylenes	10	U	ug/L
Contaminant	04-Jun-01	BTEX	Benzene	10	U	ug/L
Contaminant	04-Jun-01	BTEX	Toluene	10	U	ug/L
Contaminant	04-Jun-01	BTEX	Ethylbenzene	10	U	ug/L
Contaminant	04-Jun-01	BTEX	Total Xylenes	10	U	ug/L

FIGURE 1. WELL PW-13 WATER LEVEL AND CONTAMINANT LAYER THICKNESS

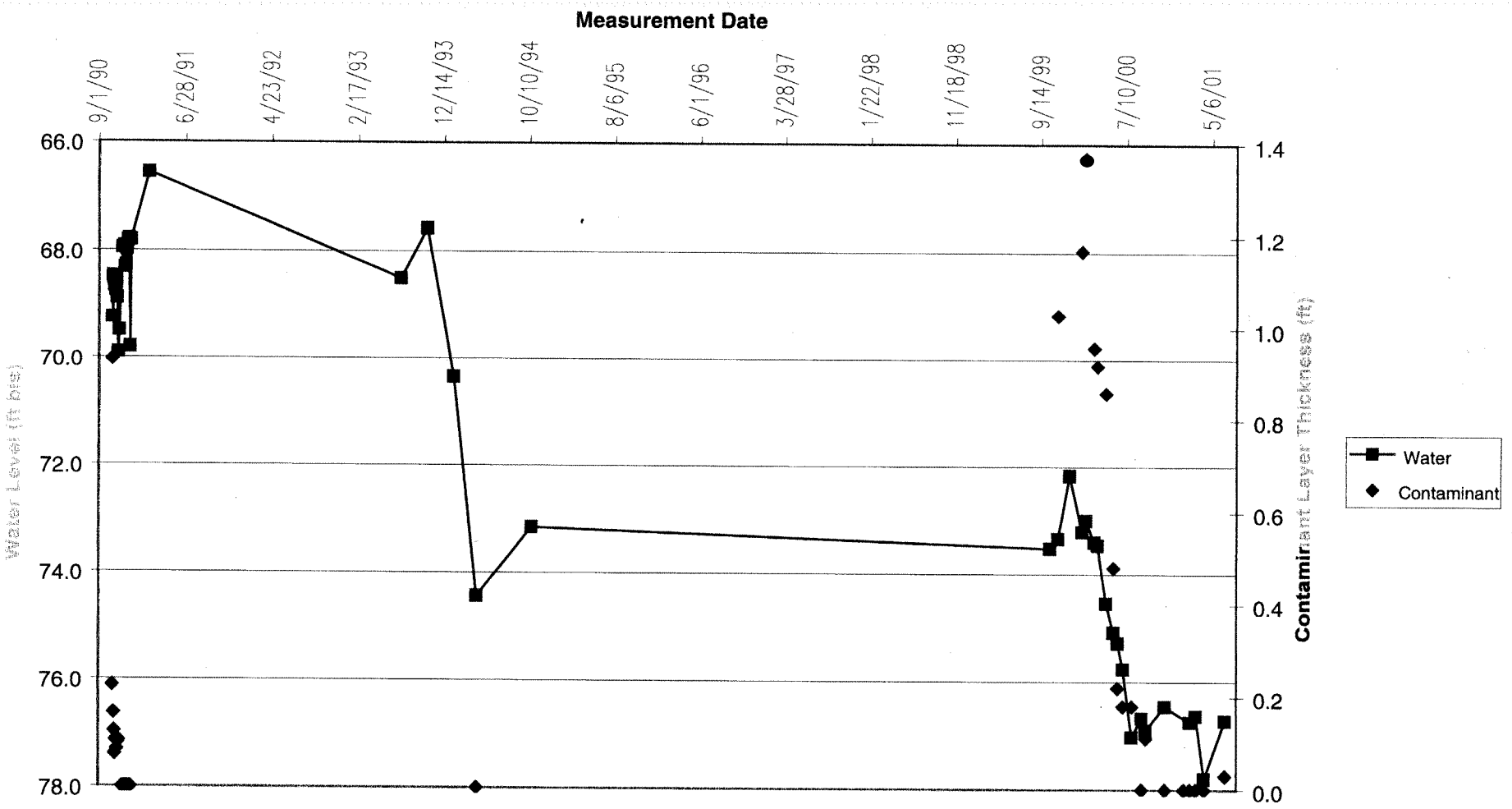


Table 2

PW-13 WATER LEVEL

WELL	SAMPLE DATE	WATER LEVEL (FT BLS)	COMMENTS	CONTAMINANT LAYER THICKNESS (FT)
PW-13	21-Sep-90	NA	0.50-ft contaminant layer	0.50
PW-13	17-Oct-90	69.25	0.93-ft contaminant layer	0.93
PW-13	19-Oct-90	68.48	0.22-ft contaminant layer	0.22
PW-13	22-Oct-90	68.54	0.16-ft contaminant layer	0.16
PW-13	24-Oct-90	68.66	0.12-ft contaminant layer	0.12
PW-13	26-Oct-90	68.61	0.07-ft contaminant layer	0.07
PW-13	29-Oct-90	68.74	0.10-ft contaminant layer	0.10
PW-13	31-Oct-90	68.62	0.10-ft contaminant layer	0.10
PW-13	2-Nov-90	68.89	0.08-ft contaminant layer	0.08
PW-13	6-Nov-90	69.90	0.095-ft contaminant layer	0.095
PW-13	9-Nov-90	69.5	0.10-ft contaminant layer	0.10
PW-13	21-Nov-90	67.95	No contaminant detected	0.00
PW-13	27-Nov-90	67.92	No contaminant detected	0.00
PW-13	29-Nov-90	68.32	No contaminant detected	0.00
PW-13	3-Dec-90	68.28	No contaminant detected	0.00
PW-13	6-Dec-90	67.98	No contaminant detected	0.00
PW-13	10-Dec-90	67.82	No contaminant detected	0.00
PW-13	13-Dec-90	67.79	No contaminant detected	0.00
PW-13	17-Dec-90	69.80	No contaminant detected	0.00
PW-13	20-Dec-90	67.81	No contaminant detected	0.00
PW-13	21-Feb-91	66.56	No measurement	
PW-13	15-Jul-93	68.51	Assumed sampling date; 5.41 ug/L ethylbenzene; no measurement	
PW-13	15-Oct-93	67.58	Assumed sampling date; 5.4/5.2 ug/L ethylbenzene; no measurement	
PW-13	15-Jan-94	70.35	Assumed sampling date; 3.6/4.5 ug/L ethylbenzene; no measurement	
PW-13	5-Apr-94	74.44	Strong diesel odor; no contaminant detected; ethylbenzene ND at 3.6 ug/L	0.00
PW-13	15-Oct-95	73.15	Assumed sampling date; 3.6 ug/L ethylbenzene; no measurement	
PW-13	13-Oct-99	73.52	No measurement	
PW-13	10-Nov-99	73.34	Contaminant level at 72.31 ft; 1.03-ft contaminant layer	1.03
PW-13	20-Dec-99	72.17	No measurement	
PW-13	2-Feb-00	73.21	Contaminant level at 72.04 ft; 1.17-ft contaminant layer	1.17
PW-13	16-Feb-00	73.00	Contaminant level at 71.63 ft; 1.37-ft contaminant layer	1.37
PW-13	16-Mar-00	73.40	Contaminant level at 72.44 ft; 0.96-ft contaminant layer	0.96
PW-13	28-Mar-00	73.46	Contaminant level at 72.54 ft; 0.92-ft contaminant layer	0.92
PW-13	27-Apr-00	74.54	Contaminant level at 73.68 ft; 0.86-ft contaminant layer	0.86
PW-13	23-May-00	75.08	Contaminant level at 74.60 ft; 0.48-ft contaminant layer	0.48
PW-13	7-Jun-00	75.28	Contaminant level at 75.06 ft; 0.22-ft contaminant layer	0.22
PW-13	25-Jun-00	75.76	Contaminant level at 75.58 ft; 0.18-ft contaminant layer	0.18
PW-13	26-Jul-00	77.03	Contaminant level at 76.85 ft; 0.18-ft contaminant layer	0.18
PW-13	30-Aug-00	76.68	No contaminant detected; residual contaminant on probe	0.00
PW-13	14-Sep-00	76.91	Contaminant level at 76.80 ft; 0.11-ft contaminant layer	0.11
PW-13	20-Nov-00	76.46	Faint odor; very smelly; not like diesel; diesel-like TICs found	0.00
PW-13	25-Jan-01	NA	Slight odor; no contaminant	0.00
PW-13	15-Feb-01	76.75	Slight odor; no contaminant	0.00
PW-13	7-Mar-01	76.64	Slight odor; no contaminant	0.00
PW-13	5-Apr-01	77.80	No contaminant detected	0.00
PW-13	18-Jun-01	76.73	Contaminant level at 76.70 ft; 0.03-ft contaminant layer; very slight odor	0.03

Specifically, in November 1999, it was found that the water level in the well had risen to 22.35 m (73.34 ft) bls, and a contaminant layer 0.31 m (1.03 ft) thick was found to be floating on the surface. In November 2000, during the last annual sampling event, collection of a sample of the contaminant layer for analysis was attempted without success. At that time, the well water level had fallen to 23.30 m (76.46 ft) bls, resulting in no product thickness being observed. However, a water sample was collected from the PW-13 well and analyzed for the presence of organics. Analysis indicated the presence of numerous organic trace constituents, including hydrocarbons ranging in length from C9 through C11, naphthalene, various substituted benzenes, higher molecular weight decanes including tetra-, penta-, hexa-, octa-, and nona- isomers. These materials are all constituents typically found in diesel. Refer to Table 1 for more details.

During that same November sampling event, water samples from the other DPWS wells nearest to Well PW-13 were also collected and analyzed for the presence of organics. The wells sampled were Wells PW-11, -12, USGS-54, and -55. No organics were found in any of these samples; however, these results do not provide clear and definitive indication of the extent of the diesel plume since none of these wells are either in close proximity to PW-13 nor are they necessarily down-gradient to it. Thus, the true extent of the contamination has not yet been defined.

During the May 2001 TRA semiannual groundwater gauging and sampling event, using the interface probe, the presence of a contaminant layer was not observed. However, when Well PW-13 was sampled, initially a dark colored material was drawn during the first 20 to 30 seconds of the purge cycle. When the water cleared, samples were drawn. To determine the nature of the dark material, samples were obtained from the Well PW-13 purge water drum. It is of interest that the dark material was not found as a floating layer on top of the water in the drum. Rather, it was actually present as a layer on the bottom below the water. These samples have been submitted for analysis for the presence of diesel-type organics. The analyses are currently in progress. Preliminary, invalidated results have been obtained indicating the presence of various diesel and gasoline range organics. These results are also compiled in Table 1. No other classes of organics have been indicated during the analyses. The gasoline-range organics are possibly a result from the degradation of the diesel contamination over time.

The initial assumption was that the interface probe results were in error and that a floating contaminant layer was present but had not been indicated. Further investigation indicated another scenario was more probable. The measured water level was approximately 24 m (78 ft) bls. Therefore, there was indeed no floating layer since this water level is below the point where a contaminant layer was observed in the past. Furthermore, the well was sampled at approximately 26 m (85 ft) bls. This indicates that the sample may have been drawn from a heavy layer residing below the water. Since the well is completed down to 27 m (87.5 ft) bls, the heavy layer is estimated to have been approximately 0.76 m (2.5 ft) thick. There is insufficient evidence at this time to confirm the existence of the dense layer. Further sampling will be conducted to verify its existence or absence. On June 18, an additional set of water level measurements was collected at Well PW-13. The interface probe indicated the presence of a floating contaminant layer roughly 0.63 cm (¼ in.) thick. The probe could find no indication of a heavy layer down to the 26.5-m (87-ft) bls level.

Risk Calculations

The risk calculations for the PW-13 well due to petroleum contamination were performed using Idaho Department of Environmental Quality (IDEQ) Risk Based Corrective Action (RBCA) software. The software was developed by IDEQ based on MS Excel. The RBCA process is quantitative and the data used for the evaluation were obtained from sampling performed in May of 2001. There were no data for soil contamination; therefore, the surface and subsurface soil contamination scenarios were not modeled.

Of the data collected, only those components known to exist in diesel fuel were used for the RBCA calculations. The following paragraphs list the assumptions that were used to model the fuel leak at the Test Reactor Area (TRA) facility. The area was assumed to be 10,507,086 cm^2 (1,628,602 $in.^2$) with an 18-m (60-ft) radius. It was assumed that the thickness of the subsurface soil source was 21 m (70 ft) due to the fact that diesel fuel has reached the perched-water aquifer.

The distance from the leaking pipe to the PW-13 monitoring well was assumed to be 18 m (60 ft). The depth to the perched water was assumed to be approximately 21 m (70 ft). The break in the fuel line was approximately 1.2 m (4 ft) below surface level. Since PW-13 is a perched-water well, the slowest groundwater velocity was used, thereby assuming the most conservative condition for groundwater flow (less dilution of contaminants). The Tier 1 scenario was modeled for hypothetical future resident children and adults and for current occupational workers at the site.

Data Summary

The data that were provided for the RBCA analysis were for groundwater only (see Table 1). No sampling results were available for site surface and subsurface soil concentration input values. All of the listed BTEX (benzene, toluene, ethylbenzene, and xylene) and petroleum aromatic hydrocarbons (PAHs) in the data set were used. Additionally, all of the data points used were "U" flagged by the laboratory except for ethylbenzene, xylene, acenaphthene, fluorene, and phenanthrene, which were "J" flagged. A "U" flag means that contaminants were not detected, and the "J" flag indicates detection and an estimate of concentration, but the value is below the contracted minimum detection limit. The detection limits were 5 ug/L for the BTEX and 10 ug/L for the PAHs. The modeling results were more conservative using the minimum detection limits.

Risk Calculations and Numbers

The acceptable risk level for a Tier 1 scenario according to the IDEQ is 1E-6 individual excess lifetime cancer risk (IELCR) for each chemical and route of exposure. For noncarcinogenic effects, IDEQ selected a target hazard quotient of 0.2 for each chemical and each route of exposure. The Tier 1 scenario does not directly account for additivity (exposure to multiple chemicals) or cumulative effects of exposure to multiple chemicals through several exposure routes. The summary report does, however, list the risk and hazard indices as cumulative. So, the overall effect is a more conservative representation of the resultant risk summary.

The summary of risk and hazard index can be seen in Table 3. The major contributor to the onsite risk is the ingestion pathway. However, Well PW-13 is strictly a perched-water monitoring well and is not a groundwater production well. Also, the water in the perched water zone below TRA is slowly decreasing since the percolation ponds at TRA were closed. It is assumed that the water will eventually be gone from the perched zones, which will eliminate the potential groundwater ingestion pathway. In essence, the ingestion pathway is eliminated from the overall risk of the scenario. The remaining risk values and hazard indices clearly show no demonstrable risk to public health.

Conclusions

The results of recent monitoring and sampling at Well PW-13 are consistent with previous information from this well. The 1993–1995 sampling results show ethylbenzene a known constituent of diesel, the November 1999 data shows additional diesel components, and the June 2001 data lists diesel. There is limited organic contamination present in the well, and these analysis results show it to be consistent with degraded diesel fuel.

Based upon process knowledge and the history of events, it is estimated that the amount of diesel fuel that was discharged during the leak in 1981 is approximately 7,571 L (2,000 gal).

The floating contaminant layer is directly related to the water level in the well. It is not observed when the water level is below 23 m (74 ft) bls. Because the perched aquifer appears to be drying up, water levels above 23 m (74 ft) bls should become less frequent and the contaminant should be observed even less frequently in Well PW-13.

The major contributor to the onsite risk is the ingestion pathway. However, the perched water level is decreasing and, therefore, cannot be used as a drinking water source. In essence, the ingestion pathway is being eliminated from the overall risk of the scenario. The remaining risk values and hazard indices in Table 3 clearly show no demonstrable risk to public health.

Table 3

SUMMARY OF RISK AND HAZARD INDEX

Source	Pathway	Resident Child		Resident Adult		Commercial Worker	
		Risk	HI	Risk	HI	Risk	HI
Surficial Soil	Dermal Contact, Ingestion, and Inhalation	**0.00E+00**	**0.00E+00**	**0.00E+00**	**0.00E+00**	**0.00E+00**	**0.00E+00**
Subsurface Soil	Indoor Inhalation	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Outdoor Inhalation	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Sub-total	**0.00E+00**	**0.00E+00**	**0.00E+00**	**0.00E+00**	**0.00E+00**	**0.00E+00**
Groundwater	Ingestion	4.64E-05	5.68E-03	3.24E-05	3.98E-03	7.36E-06	2.03E-03
	Indoor Inhalation	2.64E-08	8.72E-04	1.76E-08	5.81E-04	2.27E-09	1.68E-04
	Outdoor Inhalation	5.08E-11	1.64E-06	3.39E-11	1.09E-06	1.08E-11	7.79E-07
	Sub-total	**4.64E-05**	**6.56E-03**	**3.25E-05**	**4.56E-03**	**7.36E-06**	**2.20E-03**
TOTAL		**4.64E-05**	**6.56E-03**	**3.25E-05**	**4.56E-03**	**7.36E-06**	**2.20E-03**
TOTAL (WITHOUT INGESTION)		**2.65E-08**	**8.74E-04**	**1.76E-08**	**5.82E-04**	**2.28E-09**	**1.69E-04**

Recommendation

On the basis of the information presented, the well should continue to be monitored during the semiannual groundwater events, but further action in regard to the diesel fuel is not recommended unless indicated by the results of the future monitoring.

References

R. C. Arnett, T. R. Meachum, P. J. Jessmore, 1996, *Post-Record of Decision Monitoring for the Test Reactor Area Perched Water System Operable Unit 2-12: Third Annual Technical Memorandum*, Idaho National Engineering Laboratory, INEL-96/0305, August.

Williams 2001, Personal communication with H. D. Williams, February 2001.

Attachment B

Summary of PW-13 GW Screen Analysis

In the July 16, 2001 WAG 2 conference call, the Idaho Department of Environmental Quality (IDEQ) and Environmental Protection Agency (EPA) requested an analysis be performed on the identified diesel plume, which is in contact with the perched water table in the vicinity of Test Reactor Area (TRA) located on the Idaho National Engineering and Environmental Laboratory (INEEL). The purpose of this analysis was to show that the presence of diesel fuel in the perched water table does not pose a risk to the Snake River Plain Aquifer. The analysis was run using the latest version of Groundwater Screen, commonly called GW Screen.

Given that the extent of the plume present in the perched water table is unknown and gauging data are insufficient to estimate the volume of product actually in contact with the perched water, the analysis was run assuming all 7,571 L (2,000 gal) of the spill have migrated to the Snake River Plain Aquifer. Percent mass for each of the contaminants of concern (benzene, toluene, ethylbenzene, xylenes [mixed], napthalene, and methylnapthalene commonly found to be present in diesel fuels) was taken from *Contaminated Soils—Diesel Fuel Contamination* (Kostecki and Calabrese 1992).

Calculations completed using these estimated masses indicated the 30-year average concentration of all contaminants of concern is below the Environmental Protection Agency's Region 9 Preliminary Remediation Goals (PRGs) with the exception of methylnapthalene. A determination could not be made with regards to methylnapthalene because no PRG has been published for this contaminant. Based upon these calculations and comparisons, it is believed that the presence of the diesel fuel on the perched water table poses no risk to the Snake River Plain Aquifer at this time.

The gauging and monitoring of the PW-13 perched water well will continue as established in the *Groundwater Monitoring Plan for TRA OU 2-13* (DOE-ID 2000). If an organic level is detected, it would be removed and handled appropriately.

Evaluation of TAN 40002 Diesel Oil Spill
A.S. Rood
7/26/01

Density (g/mL)	0.85		
Total Volume (gal)		2000	4000
Total Mass (mg)		6.43E+09	1.29E+10

Diesel Fuel Constituent Data and Results of Calculation

	% by Mass*	Mass (mg)	Mass (mg)	Maximum Conc (mg/m**3)	30-year Average Conc (mg/m**3)	Region 9 PRGs (ug/L=mg/m**3)	Is conc < than PRG?	
Benzene	0.02%	1.29E+06	1.66E+16	1.34E-02	1.33E-02	0.41	yes	
Toluene	0.50%	3.22E+07	4.14E+17	1.34E-01	1.34E-01	720	yes	
Ethylbenzene	0.50%	3.22E+07	4.14E+17	4.17E-02	4.17E-02	1300	yes	
Xylene (mixed)	0.50%	3.22E+07	4.14E+17	1.61E-01	1.60E-01	1400	yes	
Napthlene	0.60%	3.86E+07	4.97E+17	4.27E-02	4.27E-02	1703	yes	*see RBC calculation below*
Methynaphthalene	1.50%	9.65E+07	1.24E+18	1.69E-02	1.69E-02	n/a	n/a	

* Kostecki, P.T. and E.J. Calabrese, 1992, *Contaminated Soils—Diesel Fuel Contamination,* Association of American Railroads, Lewis Publishers, 1992.

RBC Calculation for Napthlene	Units	Reference
Oral Chronic RfD	0.02 mg/kg-d	ORNL Toxicity and Chemical Specific Factors Database
Exposure Freq	350 d/y	
Exposure Duration	30 y	
Ingestion Rate	2 L/d	
Averaging Time	25,550 days	
Body Weight	70 kg	
RBC	1.70333333 mg/L	

References

DOE-ID, 2000, *Groundwater Monitoring Plan for TRA OU 2-13,* Department of Energy Idaho Operations Office, DOE/ID-10626, Revision 1, July.

Kostecki, P.T. and E.J. Calabrese, 1992, *Contaminated Soils—Diesel Fuel Contamination,* Association of American Railroads, Lewis Publishers, 1992.